

S.N. 09/741,961

RD-27334/USA

The listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF THE CLAIMS

Claim 1 (currently amended): An organic electroluminescent light emitting device, comprising:

an assemblage capable of emitting light and an output coupler disposed adjacent to an element of said assemblage; wherein said assemblage comprising:

a first electrode;

a second electrode; and

at least one organic light emitting layer; and

wherein said an output coupler which reduces a Fresnel loss and has an index of refraction that matches an index of refraction of an element of said assemblage adjacent to said output coupler.

Claim 2 (currently amended): The An organic electroluminescent light emitting device of claim 1, comprising an assemblage and an output coupler; the assemblage comprising a first electrode, a second electrode, and at least one organic light emitting layer; wherein the device assemblage comprises an organic light emitting diode; the output coupler further reduces both a critical angle loss and in addition to the a Fresnel loss; an index of refraction of the output coupler is matched to an index of refraction of an adjacent layer of the electroluminescent device assemblage.

Claim 3 (currently amended): The device according to claim 2, wherein the index of refraction of the output coupler is the same as or close to the index of refraction of the an adjacent layer of the electroluminescent device organic light emitting diode.

S.N. 09/741,961

RD-27334/USA

Claim 4 (currently amended): The device according to claim 3, wherein the index of refraction of the output coupler is the same as the index of refraction of ~~the an~~ adjacent layer of the ~~electroluminescent device~~ organic light emitting diode.

Claim 5 (original): The device of claim 2, further comprising a transparent substrate between the output coupler and the at least one organic light emitting layer, wherein the index of refraction of the output coupler is matched to an index of refraction of the substrate.

Claim 6 (original): The device of claim 5, wherein the index of refraction of the output coupler is the same as or close to the index of refraction of the substrate.

Claim 7 (original): The device of claim 6, wherein the index of refraction of the output coupler is the same as the index of refraction of the substrate.

Claim 8 (original): The device of claim 2, wherein the output coupler comprises a matrix material containing light scattering particles.

Claim 9 (original): The device of claim 8, wherein:

the matrix material comprises a glass or polymer material; and

the light scattering particles comprise 0.1 to 20 micron light scattering particles.

Claim 10 (original): The device of claim 8, wherein the matrix material comprises silicone or epoxy containing:

titania or zinc oxide light scattering particles; and

nanoparticles having a size of less than 100 nm which adjust an index of refraction of the matrix material such that it is equal or close to the index of refraction of the substrate.

Claim 11 (original): The device of claim 2, wherein the output coupler comprises a shaped transparent material attached to the organic light emitting diode.

S.N. 09/741,961

RD-27334/USA

Claim 12 (original): The device of claim 11, wherein the shaped transparent material comprises glass or polymer material having a corrugated or dimpled light emitting surface attached to a transparent substrate of the organic light emitting diode.

Claim 13 (currently amended): The device of claim 12, wherein each dimple has a height greater than 0.1 microns and a spacing between dimple peaks is a factor of 10 or less of the dimple height.

Claim 14 (original): The device of claim 13, wherein the shaped transparent material comprises nanoparticles having a size of less than 100 nm which adjust an index of refraction of the shaped transparent material such that it is equal or close to the index of refraction of the substrate.

Claim 15 (original): The device of claim 2, wherein the output coupler comprises a transparent substrate having corrugated or dimpled light emitting surface.

Claim 16 (currently amended): The device of claim 15, wherein each dimple has a height of greater than 0.1 microns and a spacing between dimple peaks is a factor of 10 or less of the dimple height.

Claim 17 (original): The device of claim 16, wherein the substrate comprises a glass or a polymer substrate containing nanoparticles having a size of less than 100 nm which adjust an index of refraction of the substrate such that it is equal or close to the index of refraction of the device.

Claim 18 (currently amended): The An organic electroluminescent light emitting device of claim 1, comprising:

a first electrode;

a second electrode;

at least one organic light emitting layer; and

S.N. 09/741,961

RD-27334/USA

an output coupler which reduces a Fresnel loss;

wherein:

the electroluminescent device emits white light;

the first electrode comprises a metal containing electrode;

the organic light emitting layer comprises at least one an organic molecule layer or at least one polymer layer over a first side of the first electrode;

the second electrode comprises a transparent electrode having a first side over the organic light emitting layer; and

the electroluminescent device further comprising:

a voltage source; and

a luminescent material.

Claim 19 (currently amended): The device of claim 18, wherein the luminescent material comprises a phosphor layer between the a device substrate and the output coupler.

Claim 20 (original): The device of claim 18, wherein the luminescent material comprises a phosphor incorporated into the output coupler.

Claim 21 (original): The device of claim 18, further comprising:

a first device electrical contact contacting the first side of the first electrode;

a second device electrical contact contacting a second side of the second electrode;

a sealing member over the second side of the second electrode;

a mounting substrate over the sealing member; and

S.N. 09/741,961

RD-27334/USA

a plurality of organic electroluminescent devices below the mounting substrate having a fill factor of greater than 0.3.

Claim 22 (currently amended): The An organic electroluminescent light emitting device of claim 1, comprising:

a first electrode;

a second electrode;

at least one organic light emitting layer; and

an output coupler which reduces a Fresnel loss;

wherein:

a reflectivity of a non-light emitting side of the device is 80% or higher;

the output coupler optical thickness for scattering is about 0.1 to about 0.9; and

the device emission extraction is 55% or higher.

Claim 23 (original): The device of claim 22, wherein:

a reflectivity of a non-light emitting side of the device is 86% or higher;

the output coupler optical thickness for scattering is about 0.5; and

the device emission extraction is 58% or higher.

Claim 24 (currently amended): The An organic electroluminescent light emitting device of claim 1, comprising an assemblage capable of emitting light and an output coupler that reduces a Fresnel loss; wherein the assemblage comprises:

a first electrode;

S.N. 09/741,961

RD-27334/USA

a second electrode; and

at least one organic light emitting layer; and

wherein the output coupler comprises:

a first layer having a first index of refraction that is matched to an index of refraction of an adjacent layer of the ~~electroluminescent device assemblage~~; and

a second layer having a second index of refraction lower than the first index of refraction.

Claim 25 (currently amended): ~~The An organic electroluminescent light emitting device of claim 1, comprising an assemblage capable of emitting light and an output coupler that reduces a Fresnel loss; wherein the assemblage comprises:~~

a first electrode;

a second electrode; and

at least one organic light emitting layer; and

wherein the output coupler comprises a layer having a graded index of refraction, wherein an inner portion of the layer has a first index of refraction that is matched to an index of refraction of an adjacent layer of the ~~electroluminescent device assemblage~~, and an outer portion of the layer has a second index of refraction that is lower than the first index of refraction.

Claims 26 (original): An organic electroluminescent light emitting device, comprising:

a first electrode;

at least one organic light emitting layer over the first electrode;

a second transparent electrode over the at least one organic light emitting layer;

S.N. 09/741,961

RD-27334/USA

a shaped transparent material which has corrugated or dimpled light emitting surface and which contains nanoparticles having a size of less than 100 nm over the transparent electrode.

Claim 27 (currently amended): The device of claim 26, wherein:

the organic electroluminescent light emitting device comprises an organic light emitting diode;

the first electrode comprises a metal containing electrode;

the organic light emitting layer comprises at least one an organic molecule layer or at least one polymer layer;

the second electrode comprises an indium tin oxide electrode;

the shaped transparent material comprises a glass or a polymer material containing 0.1 to 20 micron light scattering particles; and

each dimple has a height of greater than 0.1 microns and a spacing between dimple peaks is a factor of 10 or less of the dimple height.

Claim 28 (currently amended): The device of claim 26, wherein the shaped transparent material comprises a glass or polymer material formed on a glass or polymer substrate.

Claim 29 (original): The device of claim 26, wherein the shaped transparent material comprises a glass or polymer material substrate onto which the organic electroluminescent light emitting device is fabricated.

Claim 30 (currently amended): An organic electroluminescent device, comprising:

a first electrode;

a second electrode;

at least one organic light emitting layer over the first electrode;

S.N. 09/741,961

RD-27334/USA

a second transparent electrode over the at least one organic light emitting layer; and
a matrix material containing light scattering particles over the second electrode, the light scattering particles having a size in range from about 0.1 to about 20 microns.

Claim 31 (original): The device of claim 30, wherein:

the matrix material comprises silicone or epoxy formed over a glass or polymer substrate; and

the light scattering particles comprise 0.1 to 20 micron titania or zinc oxide light scattering particles.

Claim 32 (original): The device of claim 31, wherein the matrix material further comprises nanoparticles having a size of less than 100 nm.

Claim 33 (withdrawn): A method of making an organic electroluminescent light emitting device, comprising:

placing a first material into a mold cavity;

solidifying the first material to form a shaped transparent material having a corrugated or dimpled first light emitting surface; and

attaching the shaped transparent material to the an organic electroluminescent light emitting device.

Claim 34 (withdrawn): The method of claim 33, wherein the step of attaching comprises:

forming a first transparent electrode over a second surface of the shaped transparent material;

forming at least one organic light emitting layer over the first electrode; and

forming a second electrode over the at least one organic light emitting layer.

S.N. 09/741,961

RD-27334/USA

Claim 35 (withdrawn): The method of claim 33, wherein the step of attaching comprises attaching a transparent substrate of the organic electroluminescent light emitting device further containing a first electrode, at least one organic light emitting layer and a transparent second electrode to the shaped transparent material.

Claim 36 (withdrawn): The method of claim 35, further comprising:

forming a glass plate over the first electrode;

forming a metal coating over the glass plate; and

attaching the organic electroluminescent light emitting device to a mounting substrate.

Claim 37 (withdrawn): The method of claim 36, further comprising attaching a plurality of organic electroluminescent light emitting devices to the mounting substrate such that the devices have a fill factor of greater than 0.3.

Claim 38 (withdrawn): The method of claim 33, wherein the first material comprises thermoplastic, thermoset or elastomeric material containing nanoparticles having a size of less than 100 nm.

Claim 39 (withdrawn): The method of claim 38, wherein the each dimple on the first light emitting surface has a height of greater than 0.1 microns and a spacing between dimple peaks is a factor of 10 or less of the dimple height.

Claim 40 (original): An organic electroluminescent light emitting device, comprising:

a first electrode;

at least one organic light emitting layer over the first electrode;

a second transparent electrode over the at least one organic light emitting layer; and

a shaped transparent material whose index of refraction is selected to match that of an adjacent layer of the light emitting device.

S.N. 09/741,961

RD-27334/USA

Claim 41 (original): The device of claim 40, wherein the shaped transparent material contains nanoparticles having a size of less than 100 nm and a corrugated or dimpled light emitting surface.